

NOTES

Oil & Gas Hazard Safety Training for Wildland Firefighters in Southwest Colorado

Created by: The Southwest Colorado Oil and Gas
Safety Working Group.

Approved by the Durango Interagency
Coordinating Group

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Oil and Gas Hazards

- The intent of the following training is to increase the overall situational awareness of the wildland firefighter while working in oil and gas fields.
- Hazards may exist that are not covered in the following material and hopefully this discussion regarding oil and gas industry safety will better prepare all personnel to identify those hazards.
- Remember, all firefighters are empowered to, and expected to actively seek all hazards and to make them known.

Training Objectives

- #1. Promote communication between the oil and gas industry and wildland fire officials before and during wildland fire incidents.
- #2. Identify standardized operating procedures for wildland fire incidents within the oil and gas field.

Case Study #2: Maverick Fire Hydrogen Sulfide Gas Exposure Incident.

Ute Mountain Ute Indian Reservation Crew members exhibited symptoms of gas asphyxiation during mop-up after nearby wells vented gas from pipelines.

Access report online at: http://www.wildfirelessons.net/documents/Final_Maverick_Lessons_Learned_Review.pdf

REVIEW:

- ♦ Actively seek oil and gas information and hazards.
- ♦ Maintain situational awareness in the oil and gas field.
- ♦ Notify and communicate hazards.
- ♦ Monitor your environment and those around you.

The End

Be Safe out there!

Contact Durango Fire Dispatch @ (970) 385-1324 for more information.



#3. Identify oil and gas industry hazards and identify the areas that hazards are known to exist.

#4. Identify ways to mitigate oil and gas hazards.

Promote communication between the oil and gas industry and wildland fire officials before and during wildland fire incidents.

Between: Dispatch/fire managers and oil and gas industry.

By: Identifying points of contact between federal wildland firefighting agencies and the oil and gas industry including oil and gas company safety representatives.

Identifying an oil and gas industry liaison who will distribute and disseminate safety and fire danger information to individual oil and gas companies and eventually to all oil and gas field personnel.

Between: Incident Commanders (IC's) and oil and gas personnel.

By: Recommending that the IC consult with oil and gas field personnel on site before implementing tactics or strategies that use or affect oil and gas infrastructure.

Between: Dispatch and Incident Commander and incoming resources.

By: Requiring the Incident Commander to notify Durango Dispatch via radio of the presence of oil and gas infrastructure and ordered and/or incoming resources will subsequently be notified by dispatch.

Objective #2:

Identify standardized operating procedures for wildland fire incidents within the oil and gas field.

- ♦ Pre-fire season
- ♦ Type 5 fires
- ♦ Type 4,3,2 & 1 fires.

Pre-fire season: An oil and gas liaison will identify oil and gas company safety representatives who will address industry issues and advise the Incident Commander during large (Type 1 through 4) wildland fire incidents. Those representatives will be contacted by dispatch to distribute annual training and update contact list.

Annually update and distribute Oil and Gas Hazard Safety Training. The Durango Zone Board will ensure that all member agencies include oil and gas hazard safety as a topic in the annual wildland fire refresher, RT-130.

Incoming and/or out of zone resources will be briefed prior to being used on an incident where oil and gas hazards exist with a detailed briefing including gas monitor use and known oil and gas hazards.

Gas Monitors:

- ♦ Numerous available but two styles generally used.
- ♦ Single Gas: Measures one gas (ie.H₂S) only.
- ♦ 4 Gas: Measures CO, H₂S, O₂, & LEL.
- ♦ Safety officers and other overhead will have 4 gas monitors and will receive the training to properly operate them.
- ♦ Other fire fighters will receive single gas monitors with a briefing on the proper use of the instrument.
- ♦ If the alarm goes off, notify chain of command and move upwind or uphill until alarm goes off. (After an Alarm sounds it will go off automatically only after gas level drops below alarm threshold.)

Case Study #1: Responding to wildland fires in Oil and Gas Fields.

Upper Colorado River Interagency Fire Management Unit:

Oil and gas personnel and equipment at risk and hindering wildland suppression efforts due to lack of communication and coordination.

Included in this handout.

- ♦ Be aware of flammable materials around the well pad. Vehicles and/or structures can provide temporary protection during a passing fire but will emit noxious fumes when heated and/or begin burning.

Oil and Gas well signs:

All well sites should be signed with the following:

- ♦ Owner (BP Amoco)
- ♦ Location – S/T/R or Lat/Long (S-29, T-33N, R-10W)
- ♦ Well Number (So. Ute 33-10-29-3)
- ♦ This one has hazards listed but not all do.

Utilities Contact Information:

- ♦ Durango Interagency Dispatch Center will be the primary contact to underground and above ground utility services for wildfires.
- ♦ Inform Dispatch of all pertinent information regarding location of existing utilities and any planned disturbances that may impact utilities (dozer ops, smoke impacts to utility lines, etc).

Standard Operating Procedures Type 5 Incidents

Type 5 Fires: Low complexity, single resource response and short duration.

Encourage communication between oil and gas field personnel and responding wildland fire personnel.

The Incident Commander (ICT5) will ensure that all personnel on the fire are qualified for the position they are performing. All other non-qualified personnel will be notified to disengage from the fire.

Standard Operating Procedures Large Fire (Type 1 – 4) Incidents

Type 4, 3, 2 & 1 Fires: Moderate to high complexity, numerous and non-local resources, multiple day duration.

The Incident Commander will notify Durango Dispatch of the presence of oil and gas infrastructure and the owner of the infrastructure near or threatened by the fire perimeter.

Durango Dispatch will contact the Oil and Gas Industry Liaison who in turn, will notify the safety representative of the owner company.

If dozer operations are anticipated, Durango Dispatch will notify the appropriate utility representatives for required actions – ie. line locate, power shut off, etc..

The oil and gas company safety representative should be available to the Incident Commander for advice and information regarding Oil and Gas industry issues

Objective #3: Identify oil and gas industry hazards and identify the areas that those hazards are known to exist.

Well Pad Infrastructure

Separator Unit



Collection Pit



Wildland fire Safety for Oil and Gas Personnel:

If you spot a wildland fire, please contact Durango Fire Dispatch immediately at (970) 385-1324 or Central Dispatch at 911 and provide the following information:

- ◆ The location of the fire using Section, Township, Range or Latitude and Longitude coordinates. If the fire is at a distance, give your location; estimate the distance and the direction the fire is located from you.
- ◆ The size of the fire (ie. one tree or one acre).
- ◆ The color and amount of smoke. (white and puffing or black and building, etc)
- ◆ Your name and contact number.
- ◆ Ensure your own safety around a wildland fire. Wait for wildland suppression personnel to arrive and notify them of oil and gas hazards, personnel in the area, access routes to and from the fire and any other helpful information you may have.
- ◆ Ensure that you have a safe route away from the fire if it grows and starts to move through the forest. Do not attempt to perform well pad work, shut in wells, move equipment, etc., if a wildfire is approaching. Wildfire managers and oil and gas safety representatives will coordinate any oil and gas operations during a wildfire.
- ◆ Drive carefully and be aware that emergency vehicles are in route and may create congestion on narrow roads.
- ◆ Move out of the area when a large fire is developing. In an extreme emergency and your escape is blocked by fire, the 2 or 3 acre cleared area around a well pad may be your safest area.

- ♦ Park at least 20 feet away from facilities and equipment.
- ♦ Avoid open pits/dumps which may contain discharging gas.
- ♦ Avoid oil and gas pumping equipment (pump jacks, well heads, etc) as they may leak toxic and/or flammable gases.
- ♦ Before starting dozer operations, ask your local dispatch to notify the appropriate utility representative.
- ♦ Do not assume pipelines are buried deeply or are directly under their markers.
- ♦ Dozer operators and bosses need to be extremely cautious.
- ♦ Maintain a high level of situational awareness as this list may not include all of the hazards present.

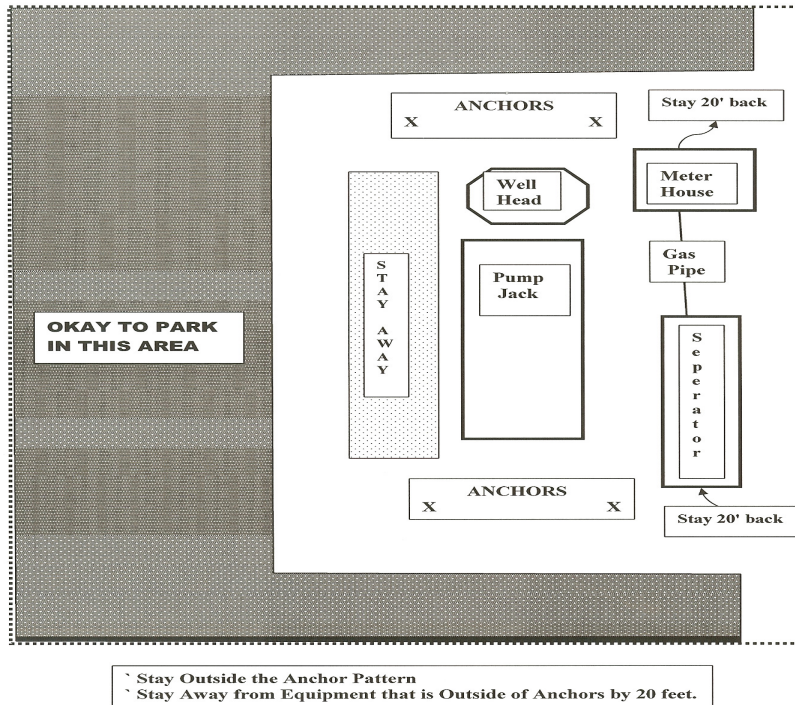
Pump head



Right of way with Dog leg



SAFE PARKING AREAS FOR FIREFIGHTERS AT GAS WELLS



Gas Hazards:

Hazardous and toxic gases are measured in Part per Million (PPM).

- Example – One drop of water in a five gallon bucket is equivalent to 1 PPM.

Hydrogen Sulfide (H₂S) – also called Sour Gas

- Toxic, Colorless gas.
- 21% Heavier than air.
- In low concentrations, has odor of rotten eggs.
- Deadens sense of smell and is flammable in higher concentrations.

Be aware of toxic gases that may be present around oil and gas facilities and monitor personnel for gas exposure symptom

Hydrogen Sulfide (H₂S) – Toxic gas heavier than air. Rotten egg smell in low concentrations.

Symptoms include: Eye irritation, nose and throat irritation, headache, dizziness, nausea, cough, difficulty breathing, loss of smell, vomiting.

Actions to take if gas is detected:

- ♦ Immediately move out of area – either upwind or uphill, notify chain of command.
- ♦ If symptoms occur:
- ♦ Same actions as detected and get medical attention if needed.

Methane (CH₄) – Principle component of natural gas. Lighter than air so the gas rises and it is odorless, colorless and flammable.

Symptoms: Unlikely will cause physical problems in open environment yet poses a fire risk in high concentrations from cell phones, cameras, etc as ignition sources.

Beware of enclosed buildings/vehicles if gas is detected.

- Be aware of oil and gas facility hazards:
 - ♦ Engines should avoid rights of way due to exposed pipes and/or pipelines.

- The Resource Boss and/or Safety Officer will make known emergency evacuation procedures and coordinate and carry out the emergency evacuation plan when necessary.
- Be aware that Oil and Gas development is occurring and expanding and you may encounter hazardous areas outside of the areas detailed above.

Oil and Gas Hazard Watch-Out Situations

Oil and gas fields have hazards that, when encountered, may pose threats to wildland firefighters. The large, open spaces created by well pads and rights-of-way may be effective areas for firefighting operations, staging areas, and safety zones yet the presence of hazardous materials, high pressure pipelines and industrial equipment can create a dangerous environment for untrained personnel. The following is a checklist of actions to take when performing wildland fire operations in an oil and gas environment.

Use caution when driving unimproved roads in the oil and gas field. Be aware of industry traffic and be on the look-out for oil and gas facilities and infrastructure. Avoid backing if possible and use a spotter when necessary.

When arriving on scene, seek out oil and gas personnel to get information on condition of the surrounding oil and gas field. Notify dispatch center of the owner, type of oil and gas facility, location in reference to the fire and any other information available pertaining to the oil and gas field and the fire.

- Could be present near well sites or in low lying areas and rarely naturally occurring.
- Hydrogen Sulfide (H₂S) – Potentially deadly at concentrations above 100 PPM.
- Symptoms include:
 - Eye Irritation.
 - Dryness/Irritation of Throat.
 - Irritation of Respiratory System.
 - Loss of Smell.
 - Headache.
 - Nausea.

Hydrogen Sulfide Effects

PPM	EFFECTS
<1	Odor Threshold
10	Obvious and unpleasant odor. Eye irritation. OSHA Permissible Exposure Limit (PEL).
20	OSHA Ceiling Limit.
100	(IDLH) Immediate Danger to Life and Health. Loss of sense of smell in 3 to 15 minutes. Altered breathing, coughing, drowsiness. Possible death within 48 hours.
500	Dizziness, Stops breathing in minutes, loss of muscle control, death.
1000	Immediate unconsciousness, death within minutes.

Response to Detected/Suspected H₂S:

- Leave Area Immediately – Go upwind and uphill.
- Seek Medical help if needed.
- Notify chain of command.

Methane (CH₄):

- Colorless
- Odorless
- 40% lighter than air.
- Principle component of Natural Gas.
- Flammable in higher concentrations.
- Naturally occurring in seeps and vents.



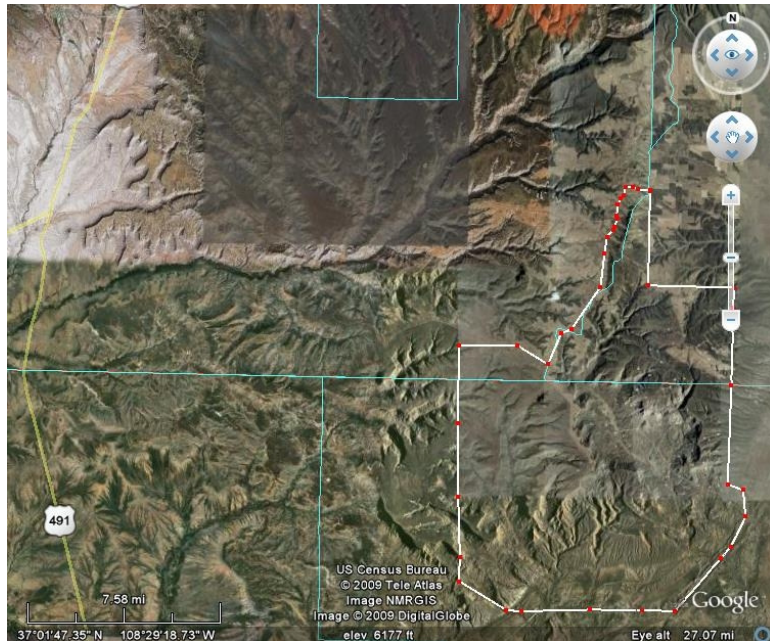
Identify ways to mitigate oil and gas hazards.

Standard Operating Procedures when suspecting or detecting gases.

- Oil and Gas Hazards Training will be given annually to firefighters within the Durango Zone.
- Fires within the Southern Ute Exclusion Zone will generally be suppressed using aerial resources with ground resources monitoring the fire from a safe distance outside of the Zone. Fires within the Buffer zone will be suppressed with ground forces carrying single gas monitors and resource bosses and/or Safety Officers carrying multi-gas monitors. Contact SUA Fire Management for more information.
- Fires within the Barker Dome area should be suppressed with personnel carrying single gas monitors and resource bosses and/or safety officers monitoring with multi-gas monitors. All suppression efforts will be coordinated through UMA Fire Management and Durango Dispatch. Contact UMA Fire Management for more information.
- Fires over the Fruitland Coal Seam require no additional SOP's yet heightened awareness is recommended.
- If anyone shows early signs or symptoms of gas asphyxiation, remove all personnel and reevaluate the safety of the operation. Immediately notify chain of command.
- All personnel will monitor themselves and fellow firefighters for symptoms.

Ute Mountain Ute Barker Dome:

The Barker Dome area is known to have gas wells with H₂S present and are referred to as “stinky gas” wells. The area covers the Southeast corner of the Ute Mountain Ute Reservation.



Fruitland Coal Seam:

Areas that are above the Fruitland Coal Seam may have gases present.

- Basin Creek
- Carbon Junction
- Florida River
- Vosburg Pike
- Texas Creek
- Pine River

Recognition of Symptoms:

- Methane (CH₄)
- Lighter than air so exposure is typically not an issue.
- Main hazard is its flammability.
- Can cause explosion in high concentrations (typically those found only in confined spaces).

Response to Detected/Suspected Methane:

- Leave Area Immediately – Go upwind.
- Beware that in rare situations a vehicle could act as a confined space - use caution before entering a vehicle by airing out if prolonged exposure has occurred.
- Notify chain of command.

Areas within the Durango Zone of known Gas Hazards:

- Southern Ute Reservation - Exclusion and Buffer Zones.
- Ute Mountain Ute Reservation - Barker Dome.
- Fruitland Coal Seam

Incidents within the Durango Zone :

- Valencia Fire, Southern Ute Reservation - In 1999, two firefighters became ill with symptoms consistent with asphyxiation and gas poisoning.
- Well Fire, Ute Mountain Ute Reservation – In 2004, Smoke jumpers experienced headaches suspected from gas wells in the area.
- Maverick Fire, Ute Mountain Ute Reservation – In 2008, several firefighters experienced nausea with one vomiting from gas venting from nearby pipeline operations.

Southern Ute Exclusion and Buffer Zones:

- Following the Valencia Fire incident, aerial attack is the preferred suppression strategy in this area. If ground attack is necessary, certain precautions must be taken. Refer to the Southern Ute AOP or call Southern Ute Fire Management for more information.

